



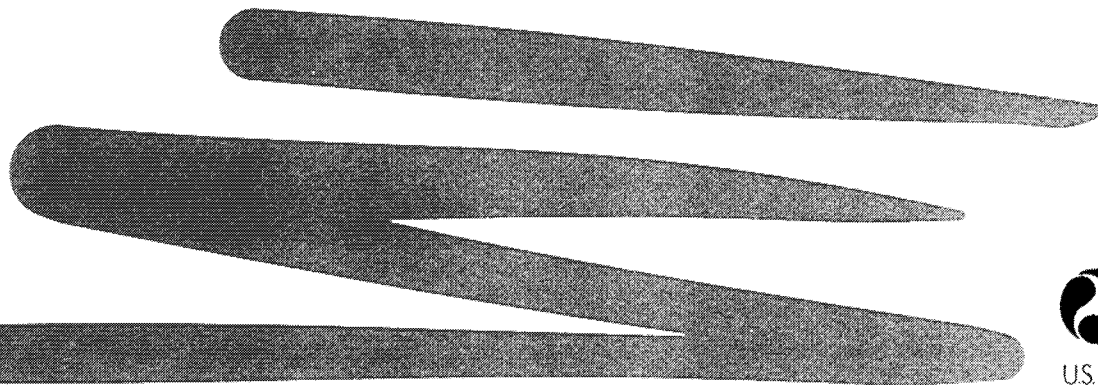
INNOVATION AND INTEGRATION  
FOR BETTER OPERATIONS

# 21st Century Transportation Infrastructure Symposium

LINKING REGIONAL  
PLANNING AND OPERATIONS  
FOR EFFECTIVE ITS  
DEPLOYMENT

EXECUTIVE SUMMARY

December 16–17, 1996



U.S. Department  
of Transportation

**Federal Highway  
Administration**

## Foreword

This *Executive Summary* (FHWA-SA-98-001) summarizes the symposium entitled *21st Century Transportation Infrastructure Symposium: Linking Regional Planning and Operations for Effective ITS Deployment: Proceedings* (FHWA-SA-98-002). Until it is published, a photocopy of the forthcoming *Proceedings* may be requested from Ms. Laurel Radow, Federal Highway Administration (FHWA), Office of Traffic Management and ITS Applications, HTV-3, Room 3404, 400 Seventh Street, SW, Washington, D.C. 20690; fax request with name, address and telephone number to 202-366-8712. The symposium was jointly sponsored by the Federal Highway Administration (FHWA), the Volpe National Transportation Systems Center (VNTSC), and the Federal Transit Administration (FTA).

On December 16-17, 1996, at the Sheraton Washington Hotel in Washington, D.C., more than one hundred regional planning practitioners, systems operators, and others met to examine current practices and to consider how best to adapt those practices to link planning, operations, systems management, and traveler information to obtain the most efficient use of our surface transportation system, and to accelerate the deployment of Intelligent Transportation Systems (ITS). The presenters and respondents were selected to share their insight and experiences.

The purpose of the symposium was to help formulate recommendations for future research, policy, legislative, and administrative actions that may be considered by our offices and other public agencies to implement ITS in a regional setting. The symposium also addressed how best to incorporate improved regional and jurisdictional transportation management and operational practices, and ITS deployment into standard regional and/or statewide planning procedures, processes and practices. Finally, the symposium focused on the important linkages between regional transportation planning and operations of proposed and existing systems to enhance interagency and interjurisdictional information sharing. These linkages will become especially important as more citizens and business and commercial carriers want regional traveler information systems in the 21st Century.

## Notice

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# **21st Century Transportation Infrastructure Symposium: Linking Regional Planning and Operations for Effective ITS Deployment Executive Summary**

## **Summary of Proceedings**

### **Introduction**

A two-day symposium entitled, *21st Century Transportation Infrastructure Symposium: Linking Regional Planning and Operations for Effective ITS Deployment*, was held on December 16-17, 1996 at the Sheraton Washington Hotel in Washington, D.C.. Approximately 100 transportation professionals in regional planning, operations, and systems management met to:

- Discuss current practices in planning, operations, and systems management.
- Consider methods to adapt those practices to link planning, operations, system-management, and traveler information, which provides the most efficient use of the transportation system and accelerates the deployment of Intelligent Transportation Systems (ITS).
- Consider methods to incorporate improved regional transportation management and operational practices, and ITS deployment into conventional regional and statewide planning processes.
- Consider methods to adapt those practices to link planning, operations, and system management to enhance interagency and interjurisdictional information sharing.
- Formulate recommendations for future research, policy, legislative, and administrative actions to implement ITS in a regional setting.

The symposium was jointly sponsored by the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and the Volpe National Transportation Systems Center (VNTSC). The agenda for the first day included a morning plenary session, "Key Policy Challenges and Opportunities to Linking Planning,

Operations Systems Management, and Traveler Information," featuring several presenters and a discussion period.

The keynote lunch speaker was Rep. James Oberstar (D-MN) who discussed ISTEA Reauthorization Challenges. The afternoon agenda included four policy breakout sessions followed by a summary and critique of each session.

The morning session of the second day was a panel discussion entitled, "State and Local Challenges to Linking Planning, Operations, Systems Management, and Traveler Information," and a panel discussion of Policy and Reauthorization Implications. A synthesis report closed out the symposium. In the afternoon, the VNTSC sponsored a special session focusing on "Macro Trends and Research Developments."

This paper is organized from the major findings identified in the symposium, the research needs identified by the symposium participants, recommendations from the symposium, and the next steps needed to accomplish these recommendations.

## **Symposium Findings**

The findings of the symposium can be summarized in four broad statements:

1. A significant gulf exists between the traditional transportation planning process and ITS deployment.
2. ITS deployment initiatives offer opportunities to recast the planning and operations relationship.
3. ITS is one of many developments that fundamentally affect how surface transportation systems are planned, managed, and financed.
4. ITS and these other developments will challenge regions and the metropolitan planning organizations (MPOs) to reinvent their process, and to better define the roles of planning and operating agencies.

## **The Gulf between the Planning Process and ITS Deployment**

While the traditional planning process is modally based and focused on public capital planning, ITS focuses more on operational performance, systems integration, and private-sector participation.

Much of the first morning's discussion compared the context of the traditional transportation planning process with emerging characteristics of ITS planning. The traditional metropolitan and statewide transportation planning processes have been developed over the past 50 years through a series of Federal laws and regulations. For most of the 50 years, the focus has been the development and construction of the Nation's surface transportation system infrastructure. This infrastructure, consisting of roadways and passenger transit, has been developed primarily by public agencies with the modes being addressed almost independently. Other elements of the transportation system, including rail, air, and waterborne, have not usually been included in the metropolitan planning process. That is a subject of discussion later in this paper.

For the past 10 years, coinciding with the initial deployments of ITS, the national transportation system has increasingly emphasized management and operation of the existing facilities over construction of new facilities. The development of ITS architecture—standards and operating procedures that are based on operational performance, systems integration, and private-sector participation—provides a stark contrast to the traditional transportation planning process, as well as the traditional operating procedures of most of the Nation's operating agencies.

The traditional planning process is focused on the prioritization of public capital expenditures for individual projects, separated by mode, as evidenced by the requirement that all Federally-funded transportation projects and programs to be implemented within that region must be included in the Transportation Improvement Program (TIP) of the region's Metropolitan Planning Organization.

### **The Time Gap for Government Process vs. Private Process Is Large**

ITS raises the specter of short-term planning—thinking in terms of hours instead of years. Unfortunately, the gap between operations and strategic initiatives is large.

Most government agencies are efficient in operating the routine functions under their purview. However, government agencies have often been viewed as slow and cumbersome when they develop new strategies or change operations. Legal requirements, public involvement and other considerations add significant delays to strategic initiatives undertaken by government agencies. Because of this paralysis, the time it takes for implementing a new strategy by a government agency may be measured in years. In contrast, private-sector organizations can often implement major new strategies in days or weeks.

While most participants noted the value of the ITS approach to

operations, there was reluctance to cast aside the principles contained within the transportation planning regulations and procedures. Provisions for environmental protection and community participation are cornerstones of contemporary transportation policy, and several noted that a private sector-driven approach would have no incentive to retain these important elements.

### **ITS Deployment Initiatives Offer Opportunities to Recast the Planning and Operations Relationship**

National System Architecture and National Standards Development promote systems integration activities that could unite operations and short-term planning goals.

Transportation professionals should "bend the curve" and create innovative approaches. While there is undoubtedly a gap between the traditional planning process and the operational implications of ITS, several activities were mentioned by panelists that represented promising developments. For example, the National System Architecture Program and the various efforts to develop national standards for ITS equipment are intended to provide equipment interoperability, and common functional procedures and message sets. When equipment interoperability, and common procedures and messages are widespread, then operational system integration will be more easily achievable. The National System Architecture also provides a blueprint for regional integrated deployment.

A second-day panel on local applications and issues underscored the possibilities for new relationships. For example, the ITS Priority Corridors Program has fostered significant achievements in institutional and operational integration in the program's four corridors—the I-95 Corridor from Maine to Virginia, the Gary-Chicago-Milwaukee Corridor, the Houston Area, and the Southern California Corridor from San Diego to Los Angeles. Likewise, the Model Deployment Initiative is underway and is expected to achieve high levels of institutional and operational integration in the participating regions of the New York metropolitan area, Seattle, Phoenix, and San Antonio. The Minnesota Guidestar Program provides a statewide system of integrated ITS services. A common theme throughout the symposium was that new, innovative thinking is required by transportation professionals involved in both planning and operations in order to link planning and operations effectively. Several examples of innovative approaches were offered. They are as follows:

- The Minnesota DOT Pricing Policy, which takes a marketing approach and individual consumer decisions into account.

mechanism to deliver services that require complex, high-tech delivery and communications systems.

*Encourage MPOs to facilitate financing of ITS programs and projects:* Capitalizing on the strengths of MPOs in planning and budgeting for capital programs, symposium participants suggested that the MPO is the logical agency to address the various funding mechanisms available for ITS deployment. The use of local match, private sector financing, and the development of public and private partnerships are financial arrangements that need consideration in the ITS program.

*Encourage MPOs to coordinate the development of regional strategic transportation plans:* Several symposium participants suggested that the development of regional intermodal strategic transportation plans will foster cooperation between planning and ITS operating agencies. These regional strategic plans should be comprehensive in that they include all modes playing a significant role in that region, and the role of ITS should be addressed. The regional strategic plan should focus on transportation system management and operations along with system performance. It was recommended that a significant stakeholder and public involvement program be a part of the plan.

*Provide guidance toward the vision of ITS as a range of transportation services driven by consumer demand:* Symposium participants recommended that the long-range vision of ITS should be that transportation agencies foster a range of transportation services driven by consumer demand. Fulfillment of this vision will require major changes in traditional planning and operating processes and procedures. The Federal role is to provide leadership and guidance for regional and local agencies toward achieving that vision.

*Provide necessary funding for research to enhance the linkages between planning and operations:* The participants in this symposium recommended that the Federal ITS research program include studies and field operational tests to better understand the changing contexts of the transportation system, to develop capacity for managing transportation system performance, and to develop new tools for assessing transportation system impacts.

## **Research Needs**

The Volpe National Transportation Systems Center sponsored a roundtable discussion session on "Macro Trends and Research Developments." Twenty-five participants plus symposium attendees were invited to participate. The discussion centered on the research needs for the issues identified in the symposium. The three primary research topics generated in the session are summarized as follows:

1. To better understand the changing context of surface transportation systems, including the impacts of changing technologies, institutions, and socio-demographics;
2. To develop technical and institutional capacity to evaluate and manage surface transportation system performance, and;
3. To develop new tools and methods, particularly those based on ITS and information technology, for assessing social, environmental and economic impacts.



## **Symposium Recommendations**

In the opening remarks, the symposium participants were challenged to provide both tactical and strategic input to the state-of-the-practice of the U.S. transportation industry. The tactical input was to address the ongoing Congressional deliberations over the reauthorization of the Federal transportation bill, or NEXTEA. The strategic input was to address the current transportation system and any changes that may be needed.

### **Tactical Recommendations Regarding NEXTEA**

The symposium participants agreed that NEXTEA should include language that supports integration of operational performance and planning as part of the transportation system development process for Federally-funded projects and programs. It is recommended that NEXTEA include provisions to support ITS deployment through incentives that focus on operations and maintenance, and systems integration activities. Specific ITS programs in NEXTEA should include a major professional capacity building program that addresses the full range of ITS topics and modifications to the metropolitan and statewide planning/programming process that will enhance ITS deployment, and that grants incentives to develop partnerships for providing efficient transportation services.

Several additional proposals for additions to NEXTEA were presented and debated by the symposium participants. However, a consensus was not reached on these issues. These issues are described briefly below.

### **National ITS Deployment Plan: a National Plan On Which ITS Systems Can Deploy**

The National Plan should be drawn from local/regional/state plans. The National Plan would address systems integration, standards, and architectural issues, and would provide the focus for deployment in NEXTEA as the focus of ISTEA was on ITS research.

Provision of five percent of the NEXTEA funds for ITS deployment: A program for states to convert up to five percent of Federal transportation funds to ITS deployment. Conversion to ITS funds is proposed to be voluntary. Some participants felt that specific percentages would be confining and may limit flexibility. Others suggested that having a set-aside percentage would help to overcome inertia in some states.

Reconstitution of MPOs: One participant proposed a mandated change in the membership of MPO boards to include the private sector provider and intermodal participants. Several participants suggested it

would be disastrous for the Federal government to get involved in what are now regional and local matters.

### **Strategic Recommendations Regarding Transportation System Enhancement**

The participants in the symposium recommended that over the next several years, the Federal ITS and other transportation programs should provide guidance and encouragement for the development of new institutional relationships among regional ITS initiatives, regional planning activities, and local and state operating activities. Several specific recommendations are listed below:

#### *Mainstream ITS into the regional and statewide planning process:*

Symposium participants suggested that ITS should be an important part of the overall transportation system development and a tool to manage and operate the system. As a major element of the system, ITS must be incorporated into the mainstream of the traditional transportation planning process at both the statewide and metropolitan levels. Conducting ITS planning separately will negate many of the inherent advantages of ITS such as intermodalism, system operation, and system performance monitoring.

*Encourage MPOs to assume a role of regional coordination, facilitation, and education in ITS deployment:* The participants in the symposium recommended that the strengths of MPOs lie in convening regional participants, providing coordination for regional ITS planning activities, facilitating regional operating plans and procedures, assisting in conducting capacity building programs for local planners and operators, and providing education and outreach for ITS potential program partners and the general public.

*Provide incentives for planning and operating agencies to develop public/private partnerships to deploy ITS services:* Symposium participants recommended that public/private partnerships are key to the full deployment of the range of transportation services that could be provided by ITS activities. Neither planning nor operating agencies are capable or are likely to become capable of delivering the range of transportation services envisioned to be available in the near future. Some are available now. Services such as travel information can be delivered on demand through pricing options that are tailored by route and in real-time and commercial vehicles permitting and data services can be delivered in real-time. Most planning and operating agencies are not currently organized or staffed to provide these types of services. Many symposium participants suggested that the private sector through partnerships with the appropriate public agencies is the most efficient

- City centers may be viable but no longer dominant; regions will have multiple centers.
- Subregional centers are likely to increase services and become walkable, liveable communities.
- The notion of sustainable transportation systems must be incorporated into the design process. Thus, problems formerly external to the transportation implementation process, for example, air quality, water quality, social equity, are no longer external to that process.

The initial vision of ITS, vehicle/infrastructure communications is not adequate. A new vision of an integrated intermodal transportation system that is planned, managed and operated on a regional scale is needed. This new vision requires that regional and local agencies shift from capital project planning to strategic system operating and management plans.

The liveliest debate of the symposium was over the role of the public sector and the degree to which private-sector involvement and free market demand should play in the implementation of the new vision of ITS.

### **The Changing Transportation Context Will Challenge Regions and MPOs to Reinvent Their Process**

#### ***Planning and Operations Staffs Do Not Work Together Well, Institutional Innovation Is Required for a Smooth Working Relationship***

One of the key findings from both the symposium sessions and the breakout groups was that the planning staffs in MPOs, cities, counties and State agencies have different experiences and points-of-view than those of the operating staff in the same agencies and in different organizations. Planners work within processes, develop and evaluate strategies, and are comfortable in thinking long term. Operators usually work in short-term time frames, respond to daily problems with immediate solutions, and are comfortable in working with and procuring high-tech equipment. The symposium participants agreed that the regional scale was appropriate for ITS deployment and that each region should have the flexibility to define roles for the regional players. The challenge for each region is to have the participants in ITS deployment come together, learn each other's strengths and weaknesses, define appropriate roles for participants, and set communications channels that foster smooth working relationships.

### *Transportation/Information/Communications Technologies and Institutions Need to Be Integrated*

ITS is based on systems integration. This integration requires standards, protocols, and messages that are compatible, and equipment that is interoperable. Rapid changes in the telecommunications and information industry make integration of transportation systems more complex everyday. The challenge for planning and operating agencies is to obtain and manage the necessary skills to achieve system integration and to maintain it. Most transportation and planning agencies are not currently capable of even elementary integration processes.

### *Planning and Operating Agencies Need to Focus on Services and System Performance, Not Projects*

As has been noted, today's transportation planning and operating agencies focus on planning, development, and construction of projects, with operations and maintenance as lower-priority functions. One symposium speaker noted, "In future transportation, service is the mission, not just one of many visions." Transportation will be viewed as a bundle of product and service options, with service levels commensurate with price. Today's transportation agencies are not organized or staffed to support systematic transportation service delivery, whether the delivery is direct from the agency or delivered by a revenue-driven service provider. Similarly, planning agencies rarely use system performance as a planning tool. Symposium participants agreed that system performance evaluation is required for transportation system management and operations. The challenge for transportation is to develop the internal institutional organization and staffing that will promote the delivery of transportation as services and products, and to conduct planning through the use of system performance evaluation.

### *The Roles of Planning and Operating Agencies Should Be Flexible in Each Region—Not Mandated*

Symposium participants were very clear that the roles of the planning agencies, including the MPO, and operating agencies should be defined by the local participants in that region. A Federal mandate prescribing roles for agencies will not aid ITS deployment or transportation system operations and management. In fact, a mandate would likely retard progress. The challenge for transportation agencies in each region is to clearly define appropriate roles all participating agencies and private-sector participants can take in the development of the transportation system.

- ITS information dissemination, Advanced Traveler Information Systems programs, such as TravInfo in the San Francisco Bay area, TravLink in Minnesota, and the SmartRoutes System in Boston, which use a marketing and consumer service approach.
- Intermodal planning and operations programs such as the I-95 Corridor Coalition, which develops projects that include several modes working together as a transportation system rather than as individual parts.
- Linking of transportation and communications programs such as the Regional Telecommunications Plan developed for the Tucson area by the Pima Council of Governments.

### **ITS Is One of Many Developments Affecting Transportation System Planning, Management, and Finance**

The context in which the Nation's transportation system is operating is changing rapidly. Several major factors are significantly influencing transportation decisions, including consumer demand, economic restructuring, infrastructure supply, and evolving institutions.

Several participants noted that consumer demand for quality and convenience is ever increasing. U.S. consumers place a higher value on time than in the past; advances in technology have greatly raised expectations in the performance of information systems; a wider range of price/quality options are available and expected, and many products and services (for example, computers, Internet, cellular phones) have experienced rapid increases in use and demand. This increased consumer expectation for service delivery certainly carries over into transportation.

While the transportation of people has not experienced great changes recently, the movement of goods has seen rapid innovation in the past few years. The freight industry has instituted just-in-time delivery and decentralization of warehousing, which has created a significant increase in freight trips.

One often-noted element of this shifting demand is the economic restructuring that has caused changes in demand for transportation services. The global movement of capital through electronic means provides more options and brings international participants for financing of transportation projects. Advances in computers and technology have reduced labor demand in many sectors, such as clerical, manufacturing—and increased demand in others—services, software, telecommunications. The skill and training requirements for this labor shift have greatly increased. The most rapidly growing labor demands

are in knowledge-based work such as information science, programming, and engineering, and in the provision of services. The Internet, which is a vast distributed network controlled by no one, is still rapidly growing and changing. The Internet, which features accurate and instantaneous linkages of businesses and economic sectors, produces expectations for a faster, more intensive transportation system.

Infrastructure supply is undergoing rapid change. Explosive growth in telecommunications and information technology is creating a "technology push" situation. As technology advances, the new technology "pushes" itself into the marketplace and creates previously non-existent demand. The communications infrastructure is perhaps, the fastest growing technology. Communications devices, particularly portable wireless devices, are becoming worldwide and the pressure for service is increasing. As the communications, information and computer services are being developed and enhanced, their orientation is increasingly organized around integrated systems and networks.

Institutional change in agencies responsible for transportation services also is occurring rapidly. Many government agencies and authorities are facing deficits and reduced budgets, which force changes in traditional methods and procedures. Political forces in the United States are shifting away from "big government" solutions to societal problems, thus governments are being deregulated and reduced in size and scope. Since the demand for services by the public remains the same, or is increasing both in size and in new services, functions and services formerly provided by government are being privatized or commercialized.

The implications of these developments are many; symposium participants noted the following:

- Travel demand will become much harder to estimate accurately for many reasons.
- Knowledge workers and service workers—who are the fastest growing sectors of the economy—are often more decentralized and less tied to a central workplace than the clerical and manufacturing workers whom they replaced.
- The impact of telecommuting and teleshopping, and the home delivery of services, is not yet known.
- The movement of freight is becoming increasingly more significant.









